1. In the figure, two charges $q_1 = +3.0 \, \mu C$ and $q_2 = -2.0 \mu C$ are separated by 6.0 cm.

   a. Find the electric forces exerted on each other (magnitude and direction)
   b. Find the electric field from point P, which is 4.0 cm to the right of q_2 (magnitude and direction).
   c. Find the positions along the line connecting two charges where the electric field is zero.
   d. Find the electric field a point P', which is 4.0 cm directly above the midpoint between the two charges. Express the answer by unit vectors.

Assuming $k = 9.0 \times 10^9 \, Nm^2/C^2$ and $\varepsilon_0 = 8.85 \times 10^{-12} \, C^2/Nm^2$
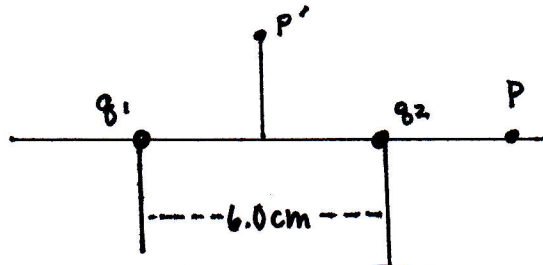
2. In the figure of problem #1, a third charge $q_3 = 1.0 \, \mu C$ is brought to position of P'.
   a. Find the electric potential energy U of the three-charge configuration.
   b. With q_3 located at P', find the electric potential V at the location of the midpoint between q_1 and q_2, where there is no electric charge.